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ABSTRACT

This study evaluated the relationships between cognitive and affective taxonomic outcomes of a required college level course in personal health education. Additional purposes of the study were to: (1) devise valid assessment instruments to facilitiate measurement of cognitive achievement and affective change using the Taxonomy of Educational Objectives; (2) determine the effects of a required course in personal health education on the knowledge and attitudes of college students on five selected subscale topics; and (3) evaluate the relationship between hierarchical patterns of the cognitive and affective domains of the Taxonomy of Educational Objectives within the realm of health education. Subjects included approximately 100 students from two personal health education classes in the instrumentation phase. Subjects in the experiemental phase consisted of approximately 506 students. A 138-item Personal Health Knowledge and Attitude instrument was used to assess personal health knowledge and attitudes and health locus of control. Based on the results of the study, it was concluded that the required course in personal health was effective in improving the health knowledge and control of college students and that a relationship does exist between the cognitive and affective taxonomies. (Author/JD)

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AN EVALUATION OF THE RELATIONSHIP BETWEEN COGNITIVE AND AFFECTIVE TAXONOMIC OUTCOMES OF A UNIVERSITY PERSONAL HEALTH EDUCATION PROGRAM

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This paper was presented at the Research Consortium of the Annual Convention, American Alliance for Health, Physical Education, Recreation and Dance, Atlanta, Georgia, April 18, 1985.

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ABSTRACT

The major purpose of this study was to evaluate the relationships between cognitive and affective taxonomic outcomes of a required college level course in personal health education. Additional purposes of this study were:

1) To devise valid and reliable assessment instruments to facilitate classroom measurement of cognitive achievement and affective change utilizing the Taxonomy of Educational Objectives.

2) To determine the effects of a required course in personal health education on the knowledge and attitudes of university students on five selected subscale topics.

3) To evaluate the relationship between hierarchical patterns of the Cognitive and Affective domains of the Taxonomy of Educational Objectives within the realm of Health Education.

Subjects for this study included approximately 100 students from two personal health education classes in the instrumentation phase. Subjects in the experimental phase consisted of approximately 506 students. The control group included 110 students from six Mathematics and two English classes, while the experimental group consisted of 396 students from all of the required personal health classes, spring semester, 1984. The required Personal Health course was taught by four instructors from the Department of Health Education at Eastern Illinois University. All four instructors utilized the same organizational structure in regard to course objectives, required texts, evaluation and grading.

A 138 item Personal Health Knowledge and Attitude instrument was utilized to assess personal health knowledge, personal health attitudes, and health locus of control. The instrument was developed by using the hierarchical structure of the Taxonomy of Educational Objectives, Cognitive and Affective Domains, for the topics of alcohol use, smoking behavior, stress-stress management, exercise-rest and nutrition-weight control. The instrument was evaluated by a panel of educational psychologists and a panel of health educators and was declared construct and content valid.

The research design for this study was a repeated measures, pre-test, post-test experimental-control group design with subjects matched across time. Data analysis was divided into two phases. Phase I pertained to the evaluation of cognitive and affective outcomes of the required course in personal health. Statistical procedures for this phase utilized separate two-way ANOVAS (time x group) for cognitive and affective taxonomic subscales and also for total scores for these three scales. The second phase deals with the relationship between the affective and cognitive Taxonomic Levels of Educational Objectives within the realm of Health Education. An analysis was performed in this phase on the affective subscale mean scores across four cognitive taxonomic levels, followed by four univariate F-tests using Wilks Lambda (U-Statistic) to determine significant mean differences.

The major findings of the study were:

1. The Personal Health Knowledge and Attitude Questionnaire reflected the necessary psychometric properties and was determined construct and content valid by a panel of educational psychologists and college level health educators, respectively.

2. Students exposed to the required course in Personal Health demonstrated significantly higher cognitive scores than those students in the control group from pre-test to post-test.

3. Students exposed to the required course in Personal Health demonstrated significantly higher attitude scores than students in the control group from pre-test to post-test.

4. Students exposed to the required course in Personal Health demonstrated significantly higher scores in health locus of control than those students in the control group. This finding is due in part to control students slightly decreasing and experimental students increasing their internal locus of control.

5. A linear relationship was demonstrated between performance at the different levels of the affective and cognitive taxonomies. An overall pattern of higher affective performance at higher levels of cognition was established by students in the experimental group.

Based on the results of this study, it was concluded that the required course in personal health was effective in improving the personal health knowledge and attitudes of control of university students. The required course in personal health is a worthwhile and beneficial course for all students at Eastern Illinois University. Significant changes toward a more qualitative and effective lifestyle appear to be evolving in those students who have completed the course.

Based on the findings of this study, a relationship does exist between the cognitive and affective taxonomies, they are parallel in nature and there is an intimate relationship between cognitive learning and affective internalization. This relationship exists at the knowledge/receiving levels as well as the analysis-synthesis/organizational levels. The Taxonomy of Educational Objectives is a valid and useful hierarchical model within the field of Health Education.

INTRODUCTION

It has been well documented that the leading causes of death in the United States, heart disease, cancer and stroke, are related to personal health behavior (American Heart Association, 1983, Department of Health, Education and Welfare, 1979, Preventive Medicine U.S.A., 1976). The majority of the ten leading killers in the United States are the result of long established patterns of behavior and are for the most part, preventable. The (1979) Surgeon General's Report on Health Promotion and Disease Prevention states, "...of the ten leading causes of death in the United States, at least seven could be substantially reduced if persons at risk improved five habits: diet, smoking, lack of exercise, alcohol abuse, and the use of hypertensive medications."

The national prevalance of lifestyle related disease is a constant reminder of the need for effective personal health education that aims at prevention. Currently, the United States is actively involved in health promotion, of which, school based programs are an intricate component.

The mission of Health Education, as suggested by Bedworth and Bedworth (1978) is to provide the individual with the ingredients necessary for more effective living. Health goals are related to these ingredients. A health goal, therefore is the predetermined purpose of the health learning experiences. Bedworth and Bedworth (1978) state that the chief goals of health education are threefold: (1) the acquisition of health knowledge, (2) the improvement or reinforcement of health attitudes, and (3) the improvement or reinforcement of health behavior.

School based health education programs have been found in recent studies to increase knowledge reliably about: cardiovascular disease and its

associated risk factors (Holcomb, Carbonari; Weinberg and Nelson, 1981; Way, 1981; Podell, Keller, Mulvihill, Berger and Kent, 1978; and Feng, 1980), drug and alcohol usage (Mooney, Roberts and Fitzmahan, 1979 and Smart and Fejer, 1974), cigarette smoking (Thompson, 1978; Botvin and McAlister and Redican, Olsen and Stone, 1978) and human nutrition (Kirk, Hamrick and McAfee, 1980 and Coates, Jeffery and Slinkard, 1981).

Efforts have also been made by health educators in schools and other settings to modify, change and measure attitudes and beliefs concerning health practices on the assumption that they would have functional value in mediating behavioral changes. School health programs have been successful in improving attitudes toward cardiovascular disease and its risk factors, drug and alcohol abuse, cigarette smoking and human nutrition (Sorochan, Ulrich and Coleman, 1971; Fultz, 1977; Vierke, 1980 and Green and Iverson, 1982).

Relationships between factual knowledge, attitudes and health behaviors, however, have been less frequently tested or established (Stainbrook and Green, 1982).

PURPOSE

The major purpose of this study was to examine the relationship between cognitive and affective taxonomic outcomes of personal health education among undergraduate students at Eastern Illinois University. In other words, to determine the association between how much college students learn about personal health, how that level of knowledge compare with their attitudes about health and do these attitudes lead to positive health behaviors. The purpose was also to utilize the cognitive and affective domains of the Taxonomy of Educational Objectives (Bloom, 1956 and Krathwohl, 1964), as a theoretical framework for investigating the relationship between cognitive and affective

outcomes of a university personal health education program. These two taxonomies were chosen on the basis of their hierarchical structure, their parallel nature and because they both have in their lower categories, simple concrete behaviors which serve as "building blocks" for more sophisticated behavior.

The Taxonomy of Educational Objectives, Cognitive and Affective Domains

The authors of the Taxonomy of Educational objectives (Bloom, 1956 and Krathwohl, 1964) refer to these theoretical concepts as cognitive and affective domains. They provide a classification system for educational objectives based on components of each of these domains. This system can be viewed as a hierarchy of objectives; as an individual's thinking advances through a domain, the level of learning and/or behavior demonstrated increases in sophistication.

A close relationship exists between the cognitive and affective Taxonomies, they are parallel in nature and there is an intimate relationship between cognitive and affective learning. This relationship is operative at the knowledge-receiving levels as well as the analysis/synthesis-organization levels. As the author of the Affective Taxonomy (Krathwohl, 1964, p. 62) points out:

> "The two domains are tightly intertwined. Each affective behavior has a cognitive behavior counterpart of some kind and vice versa. An objective in one domain has a counterpart in the opposite domain, though often we do not take cognizance of it... Each domain is sometimes used as a means to the other, though the more common route is from the cognitive to the affective. Theory statements exist which permit us to express one in terms of the other and vice versa."

The cognitive domain relates to the individual's ability to deal with knowledge and factual information from an intellectual perspective. It is arranged into six major classes which move from simple to complex. The classes are: knowledge, comprehension, application, analysis, synthesis, and evaluation.

The affective domain involves personal interests, attitudes, values, and the development of appreciations and adequate adjustments. Again a hierarchy exists ranging from the simple to the complex. The following is the classification of the affective domain: receiving, responding, valuing organization, and value complex.

METHODOLOGY

This study consisted of an instrumentation phase and an experimental phase. The instrumentation phase consisted of developing the personal health knowledge and attitude instrument, and pilot-testing it in two personal health classes similar to the classes being used in the experimental phase. The experimental phase consisted of utilizing the Personal Health Knowledge and Attitude Questionnaire in assessing the effects of a basic required health course on the cognition and affect of college students. The relationship between cognitive and affective outcomes of personal health education at the college level was also determined.

Instrumentation

The primary instrument employed in this study was an eighty item Personal Health Knowledge and Attitude Questionnaire developed by the investigators in the pilot phase. This instrument consisted of five sub-scale topics: Nutrition-Weight Control, Stress Management, Exercise-Rest, Alcohol Use and Smoking Behavior. The knowledge section of the instrument contained thirty multiple choice items, each having four response alternatives, and ten multiple true-false items each having five cognitive statements. This scale was developed from a table of specifications utilizing Bloom's Taxonomy of Educational Objectives, Cognitive Domain. Knowledge items were selected to represent the knowledge, comprehension, application, and analysis-synthesis levels

of the cognitive taxonomy for all five subscale topics. Each of the five subscales contained eight knowledge items, two items for each of the four levels of the cognitive taxonomy.

The attitude section of the instrument consisted of forty, five point Likert Scale items. The five response choices to each attitudinal item included: strongly disagree, disagree, undecided, agree and strongly agree, in that order. This scale was developed from a table of specifications utilizing Krathwohl's Taxonomy of Educational Objectives, Affective Domain. Attitude items were selected to represent the receiving, responding, valuing and organization levels of the affective taxonomy for all five scale topics. Each of the five subscales contained eight attitude items, two items for each of the four levels of the affective taxonomy.

The instrument was evaluated by a panel of educational psychologists and a panel of health educators and was declared construct and content valid. Internal consistency for the cognitive scale, measured by the KR-20 was .65 and the value of 3.73 for the standard error of measurement, were indications that the cognitive instrument was reliable. Cronbach reliability coefficients were computed for each subscale of the attitude scale, these ranged from .67 to .81. Based on subjective evaluation of the forty attitude statements and the high reliability coefficients the affective instrument was deemed reliable.

Subjects

The subjects for this study included undergraduate students at Eastern Illinois University during the fall and spring academic semesters, 1983-84. Approximately 100 students from two personal health education classes comprised the instrumentation phase. Subjects in the experimental group consisted for 396 students enrolled in all sections of Health Education 1200, Personal

Health, who completed the survey questionnaires. Subjects in the control group included 110 students in English and Math courses who agreed to respond to the knowledge and attitude questionnaire. English and math classes were chosen due to their similar ratio of freshmen and sophomores as well as males and females when compared to the composition of the required personal health classes. Subjects in the control group were screened out if they had previously taken a formal college level course in personal health education.

Data Collection

The Knowledge and Attitude Survey was administered by the same investigator for the sake of uniformity and to standardize test procedures. Pre-tests and post-tests were administered on approximately the same calendar days for all experimental and control classes. The students were asked to cooperate by completing the Personal Health Knowledge and Attitude Questionnaire. Completion was not mandatory. Students were assured verbally that their individual responses would be kept confidential.

For matching pre and post and identification purposes, the students were asked to give their student identification (social security) number on the front page of the survey. These data collection procedures were followed for the pre-test and post-test. All data from the Personal Health Knowledge and Attitude Questionnaire were transferred to computer optical scan sheets for statistical analysis. Subsequent analysis was performed by the investigator.

Data Analysis

The research design for this study was a repeated measures, pre-test, post-test experimental-control group design with subjects matched across time. Data analysis was divided into two phases. Phase I pertained to the evaluation of cognitive and affective results of the required course in personal health.

Statistical procedures for this phase utilized separate two-way ANOVAS (time x group) for the cognitive and affective taxonomic levels and also for total scores for these scales. Resultant F-ratios were tested at the .05 level of significance. The second phase examined the relationship between cognitive and affective taxonomic outcomes of the personal health education course. An analysis was performed in this phase on the affective subscale mean scores across four cognitive taxonomic levels, followed by four univariate F-tests using Wilks Lambda (U-Statistic) to determine significant means differences. This mean score and post hoc analysis was performed on both the experimental and control group utilizing post-test data.

RESULTS

The results are based on data collected from the 506 subjects who completed the pre and post-test in the experimental phase of the study.

Phase I: Cognitive and Affective Taxonomic Outcomes

Summarized results of the two-way ANOVAS computed on all four cognitive and affective taxonomic levels and total scores for these scales are presented in Tables 1 and 2 respectively. The major concern in this first phase of data analysis was whether or not a treatment effect occurred for cognition and affect.

Cognitive results (Table 1) indicated a significant ($p. < .01$) time x group interaction effect for the total cognitive scale scores. The experimental group (Pre $\bar{x}$ = 41.26 and Post $\bar{x}$ 45.42) scored significantly higher than the control group (Pre $\bar{x}$ 41.81 and Post $\bar{x}$ 42.85) regarding personal health cognition over the course of one semester.

Insert Table 1 about here

Cognitive results also found significant (p. <.01) time x group interactions (experimental > control) for the Knowledge, Comprehension and Application Taxonomic levels. However, analysis of variance for the Analysis-Synthesis Level found no significant time x group interaction (Table 1). This finding could be due in part, to the difficulty of the Analysis-Synthesis level of cognition and also the possible lack of student experience in responding to items of this nature.

Insert Table 2 About Here

Examination of Table 2 indicated a significant (p. <.01) time x group interaction affect for the total affective scale scores. As with cognition, the experimental group (Pre $\bar{x}$ = 142.17 and Post $\bar{x}$ = 148.36) had a significantly greater change in positive attitudes than did the control group (Pre $\bar{x}$ = 141.99 and Post $\bar{x}$ = 140.59) toward personal health from pre-test to post-test. This trend in significant (p. <.01) time x group interaction (experimental > control) was consistent for all affective taxonomic levels receiving, responding, valuing and organization.

Results from Phase I clearly indicated that a significant degree of cognitive learning and affective internalization had occurred for those students in the one semester required personal health course at Eastern Illinois University. The next procedure was to evaluate the relationship between these cognitive and affective taxonomic outcomes.

Phase II: Evaluation of the Relationship between Cognitive and Affective Taxonomic Outcomes

The intent of this second phase was to determine the association between cognitive learning and affective internalization as a result of the personal health education course. In order to determine this, subjects had to be "grouped" or classified as belonging to one of the four cognitive levels of achievement. This was accomplished by computing average subscale scores for each student using post-test data. The number of correct responses for each subscale was divided by the number of items in each subscale, i.e., 8 ÷ 10 = 80% achievement for a given subscale. It was determined by the investigators that an achievement of 60% or better (six correct responses out of ten times) would be the criteria for classification of a subject by taxonomic level. For example, if a subject received a 60% rating at the knowledge level, a 60% rating at the comprehension level, a 60% rating at the application level and a 40% rating at the Analysis-Synthesis level, he/she would belong to the application group or level of achievement. Because of this criteria (60% minimum) a number of subjects from the Experimental (72) and the control (47) were eliminated from this phase of analysis.

Examination of the data in Table 3 indicated an overall pattern of higher affective performance at higher levels of cognition for students in the required personal health course. To determine significant differences between group means, four univariate F-tests using Wilks Lambda (U-Statistic) and F-ratios were performed on the affective group-levels. The results of this analysis located in Table 4 support the overall trend of higher affective performance at higher levels of cognition. The greatest significance for this analysis was for the receiving level and the valuing level.

Insert Table 3 & Table 4 about here

As a comparative measure the same analyses were performed on the subjects in the control group. These analyses indicated that affective mean scores across the four cognitive taxonomic levels were scattered and showed no pattern of performance from lower to higher taxonomic levels. Post hoc analysis also indicated no significant differences between group or taxonomic mean scores.

CONCLUSIONS

Findings of this study demonstrated that a relationship does exist between the cognitive and affective taxonomies, that there is an intimate relationship between cognitive and affective behavioral changes and that this relationship is operative at the lower levels as well as the higher levels of the taxonomy. Data presented in Table 3 demonstrated that affective change increased in a consistent trend as the level of cognitive difficulty increased. This overall linear pattern of higher affective performance at higher levels of cognition in this study supported the theory that the cognitive and affective taxonomies are parallel in nature.

The significant findings for the receiving and valuing levels (Table 53) are difficult to interpret. Perhaps in this particular study the receiving and valuing levels had the greatest discriminatory power. The organization level represents an individuals development and consistent use of a life plan and philosophy of healthy living. Perhaps it is too much to expect from college freshmen and sophomores to have, from a one semester course in Personal Health, a well defined plan for a healthy adult lifestyle as well as a corresponding philosophy of life relating to positive health behavior. In re-examin-

ation of some of the responding level items, it is possible that positive responses to these actually represent a higher level than valuing. To illustrate, the statement "I have gone to lectures, workshops, classes and other sources of information to find out more about stress management" was assigned to the Responding category; but since this statement is related to the actual behavior of seeking additional information which may or may not be readily available on campus, it is entirely possible that positive responses to this statement actually represent a higher level than Responding. The inherent value of these results in health education is that cognitive learning and affective internalization do take place in a "building block" manner, and that both domains have in their lower levels, simple, concrete behaviors which serve as foundations for more complex behavior. These results suggest that students in health education programs need basic information but also need to be challenged to apply, analyze and synthesize health information as it relates to higher affective performance and ultimately health behavior change.

IMPLICATIONS

Teaching to the Acquisition of Higher Mental Processes

The most significant suggestion this investigation offers, is for health education curriculum, instructional objectives, methodologies and evaluation (testing) procedures to be designed at all levels of the Taxonomy, especially the higher levels of the cognitive and affective domains. Results from the second phase of data analysis indicated an overall pattern of higher affective performance at higher levels of cognition. Students in the required personal health course who performed at the analysis-synthesis level of cognition were more likely to perform at the organization level of affect. The implication is, that by teaching to the higher levels of cognition a health educator may

also be developing positive changes in attitudes and health behaviors. Health educators may wish to acknowledge these findings since the goals of Health Education are to provide information, develop positive health attitudes and ultimately modify or change health behaviors. Therefore, greater emphasis should be placed on problem solving, application of principles, analytical skills and creativity. This implies that all of these methods should be reflected in the health education materials of instruction, the learning and teaching processes used, and the questions and problems used in the formative testing and final summative evaluations.

The acquisition of higher mental processes may also enable the student to relate his or her learning to the various problems encountered in day-to-day living. These abilities, problem solving, application of principles, analytical skills and creativity should also be stressed because, according to Bloom (1984) they are retained and used long after the individual has forgotten the detailed specifics of the subject matter taught in class. These abilities are regarded as one set of essential characteristics needed to cope with a rapidly changing world.

The acquisition of higher mental processes extends beyond classroom lecture and discussion. In a personal health education course required for college graduation and taught in multiple sections, the textbook and ancillary materials take on increased importance toward effective learning at higher mental processes and toward self-assessment and health behavior change. Bloom (1984) believes that teachers in the United States typically make use of textbooks that rarely pose real problems. These textbooks emphasize specific content to be remembered and give students little opportunity to discover underlying concepts and principles and even less opportunity to attack real

problems in daily living. Results of this study suggest the use of an innovative textbook, such as An Invitation to Health by Combes, Hales and Williams (1983) in combination with the self-assessment text Wellness R.S.V.P., by Kammermann, Doyle, Valois and Cox (1983). Both of these texts employ problem solving, application of health principles, analytical skills, creativity and self-assessment.

Finally, teaching toward the higher mental processes is important because it makes the learning process of Health Education more interesting and stimulating for the student.

REFERENCES

American Heart Association, Dallas, Texas. (1983). Heart Facts.

Bedworth, D.A. and Bedworth, A.E. (1978). Health Education: A Process for Human Effectiveness. New York: Harper and Row.

Bloom, B. (1984). The 2 sigma problem: The search for methods of group instruction as effective as one-to-one tutoring. Educational Researcher, Vol. 13, No. 6, p. 4-15.

Bloom, B.S. (1956). Taxonomy of Educational Objectives: Handbooks I: Cognitive Domain. New York: David McKay Company, Inc.

Botvin, G. and McAlister, A. (1981). Cigarette smoking among children and adolescents. In Arnold, C., Kuller, L. and Greenlick, M. (eds.), Advances in disease prevention, Vol. 1, New York: Springer.

Coates, T.J., Jeffery, R.W. and Slinkard, L.A. (1981). Heart, healthy eating and exercise: Introducing and maintaining changes in health behaviors. American Journal of Public Health, 71, pp. 15-23.

Combs, B.J., Hales, D.R., and Williams, B.K. (1983). An Invitation to Health, Second Edition, Menlo Park, California: Benjamin/Cummings.

Department of Health, Education and Welfare. (1979). Health People: The Surgeon General's Report on Health Promotion and Disease Prevention. Washington, D.C.: U.S. Government Printing Office.

Feng, W.L. (1980). Evaluation of the effectiveness of a cardiovascular education pilot program. Health Education, 11, pp. 34-38.

Fultz, F.G. (1977). Effects of an experimental personal health education course and the health hazard appraisal on selected college students in Illinois. Dissertation Abstracts International, V38, (07) sec. A, p. 3968.

Green, L.W. and Iverson, D.C. (1982). School health education. Annual Review of Public Health, 3, pp. 321-338.

Holcomb, J.D., Carbonari, J., Weinberg, A., Nelson, J. (1981). Evaluation of a comprehensive cardiovascular curriculum. Journal of School Health, 51, pp. 330-335.

Kammermann, S.K., Doyle, K., Valois, R.F. and Cox, S. (1983). Wellness R.S.V.P., Second Edition, Menlo Park, California: Benjamin/Cummings.

Kirk, R.H.J., Hamrick, M., McAfee, D. (1980). Focus on health education and nutrition: Development of a guide for high school teachers. Health Education, 11 (1), pp. 21-24.

Krathwohl, D.R. (1964). Taxonomy of Educational Objectives: Handbook II: Affective Domain. New York: David McKay Company, Inc.

Mooney, C., Robert, C., and Fitzmahan, G.L. (1979). Here's looking at you - a school based alcohol education project. Health Education, 10, pp. 38-41.

Podell, R.N., Keller, K., Mulvihill, M.N., Berger, G., & Kent, D.F. (1978). Evaluation of the effectiveness of a high school course in cardiovascular nutrition. American Journal of Public Health, 68, pp. 573-576.

Preventive Medicine U.S.A. (1976). New York: Prodist.

Redican, K.J., Olsen, L.K. and Stone, D.B. (1978). Effects of a prototype health education curriculum on health knowledge of lower-socioeconomic sixth-grade students. Health Values, 2, pp. 84-91.

Smart, R. and Fejer, D. (1974). Drug Education: Current Issues, future directions. Program Reports Ser. No. 3, Toronto: Addiction Research Foundation.

Sorochan, W.D. Ulrich, C. and Coleman, G. (1971). Assessment of a basic required health education course. Journal of the American College Health Association, 19: 315-18.

Stainbrook, G. and Green, L.W. (1982). Behavior and Behaviorism in Health Education. Health Education, 13, p. 14-19.

Thompson, E.L. (1978). Smoking Education programs 1960-1976. American Journal of Public Health, 68, pp. 250-257.

Vierke, R.S. (1980). Health locus of control and health behavior among selected college students. Dissertation Abstracts International, V41, (8-A), p. 3437-3438.

Way, J.W. (1981). Project Superheart: An evaluation of a heart disease intervention program for children. Journal of School Health, 51, pp. 16-19.

TABLE 1

SUMMARY TABLE OF SIGNIFICANT ANOVA MAIN AND INTERACTION EFFECTS OF COGNITIVE TAXONOMIC OUTCOMES

	F Ratio	Significance Level
Total Cognitive Scale Scores		
Time	207.06	.01
Time x Group	404.02	.01
Knowledge Level		
Group	5.72	.05
Time	203.15	.01
Time x Group	42.02	.01
Comprehension Level		
Time	164.93	.01
Time x Group	27.33	.01
Application Level		
Group	11.48	.01
Time	104.06	.01
Time x Group	18.40	.01
Analysis-Synthesis		
Time	14.10	.01

TABLE 2

SUMMARY TABLE OF SIGNIFICANT ANOVA MAIN AND INTERACTION EFFECTS OF AFFECTIVE TAXONOMIC OUTCOMES

	F Ratio	Significance Level
Total Affective Scale Scores		
Group	5.30	.05
Time	57.02	.01
Time x Group	29.65	.01
Receiving Level		
Group	5.62	.05
Time	31.29	.01
Time x Group	20.32	.01
Responding Level		
Time	20.15	.01
Time x Group	12.81	.01
Time x Sex	4.18	.01
Valuing Level		
Time	27.95	.01
Time x Group	18.05	.01
Organization Level		
Group	8.14	.01
Time	46.95	.01
Time x Group	14.69	.01

TABLE 3

ANALYSIS OF EXPERIMENTAL GROUP AFFECTIVE TAXONOMIC

SUBSCALE MEAN SCORES ACROSS FOUR COGNITIVE TAXONOMIC LEVELS

	Receiving x Scores	Responding x Scores	Valuing x Scores	Organization x Scores
Knowledge Level	38.44	33.95	39.23	34.67
Comprehension Level	39.79	34.36	39.14	35.24
Application Level	39.93	35.00	39.57	34.92
Analysis-Synthesis Level	41.07	35.40	41.55	36.31
TOTAL $\bar{X}$ SCORE	39.79	34.65	39.73	35.13
	N=93	N=57	N=119	N=55

TABLE 4

UNIVARIATE F-TESTS USING WILKS LAMBDA (U-STATISTIC)

FOR THE AFFECTIVE TAXONOMIC SUBSCALES

EXPERIMENTAL GROUP MEAN SCORES

Taxonomic Subscale	Wilks Lambda	F	Significance
Receiving	.974	3.25	.02*
Responding	.989	1.21	.31
Valuing	.966	3.82	.01**
Organization	.990	1.56	.33

*Significant at/or beyond the .05 level

**Significant at/or beyond the .01 level